

A luminescent eulimid (Mollusca: Gastropoda) from New Zealand

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A new species of *Melanella* is described from New Zealand. The last turn of the body emits a lime yellow glow, the first record of luminescence in Eulimidae and the first record of yellow luminescence in a gastropod (otherwise blue). It is parasitic on the holothurian *Ocnus brevidentis* (Hutton, 1872). *Melanella archeyi* (Finlay, 1928) and *M. aucklandica* (Suter, 1909) are recognised as distinct species, and outer lip profiles of the holotypes are illustrated.

Key words: Bioluminescence, Eulimidae, *Melanella*, New species, Parasite, Holothurian, *Ocnus*, New Zealand.

Introduction

During a recent visit to Preservation Inlet, Fiordland, New Zealand, C.D. Paulin (Museum of New Zealand, Wellington) collected specimens of a eulimid that had been previously seen there parasitising an abundant, small, red holothurian (Fig. 1). The living eulimids proved easy to see because the last turn of the soft parts glowed luminescent lime yellow through the translucent shell (C.D. Paulin, pers. comm.). The luminescence (apparently intracellular) was continuous and restricted to the last (white in alcohol) turn of the body, where no specific site was apparent. This is the first record of luminescence in a eulimid, and the first record of lime yellow luminescence in a gastropod (otherwise blue - Nicol, 1964). The holothurian was identified (by D.L. Pawson) as the red (*carnleyensis* Dendy, 1909) form of *Ocnus brevidentis* (Hutton, 1872), which is widely distributed off New Zealand (Pawson, 1970), and abundant in Preservation Inlet, Fiordland, the type locality of the new eulimid.

Systematics

Family Eulimidae H. and A. Adams, 1853

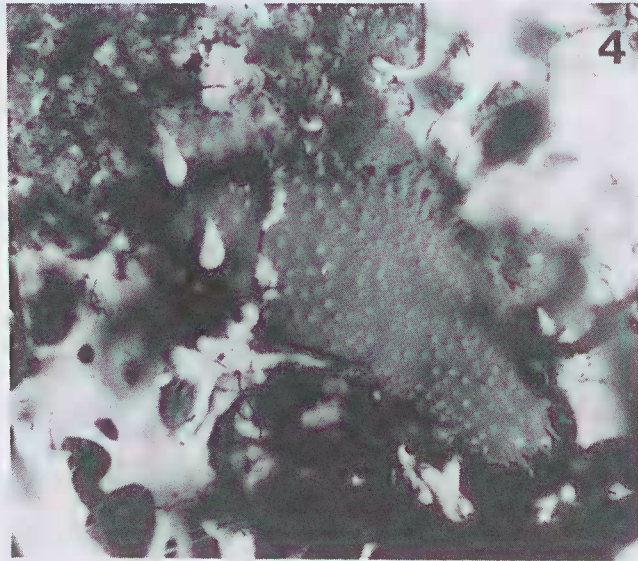
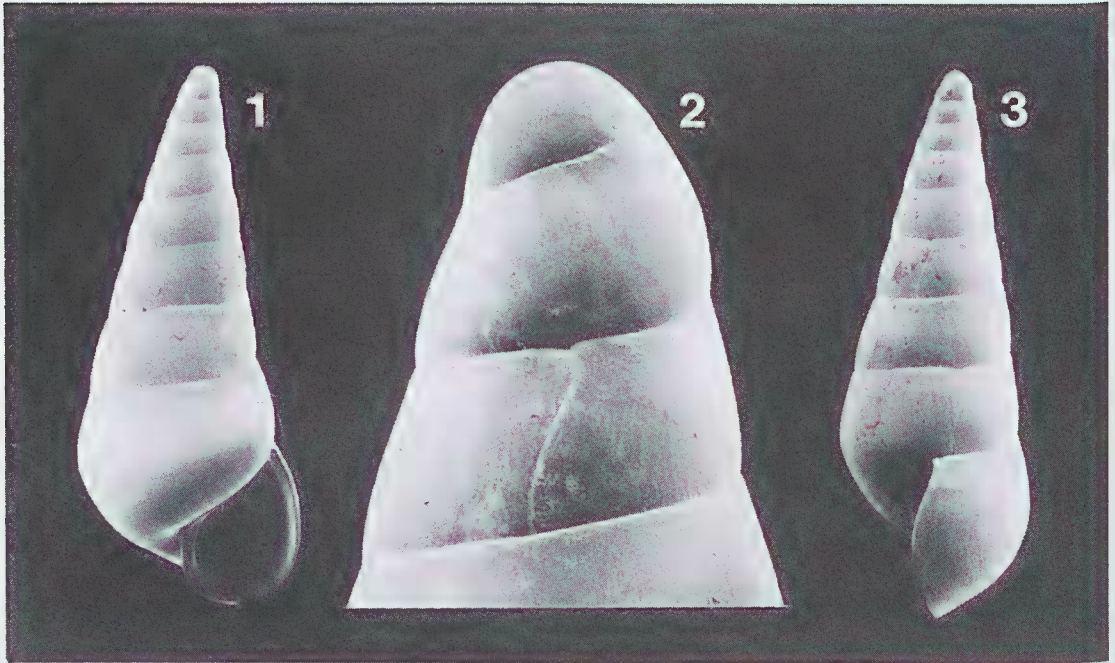
Genus *Melanella* Bowdich, 1822

Melanella Bowdich, 1822: 27. Type species (monotypy): *Melanella dufresnii* Bowdich, 1822.

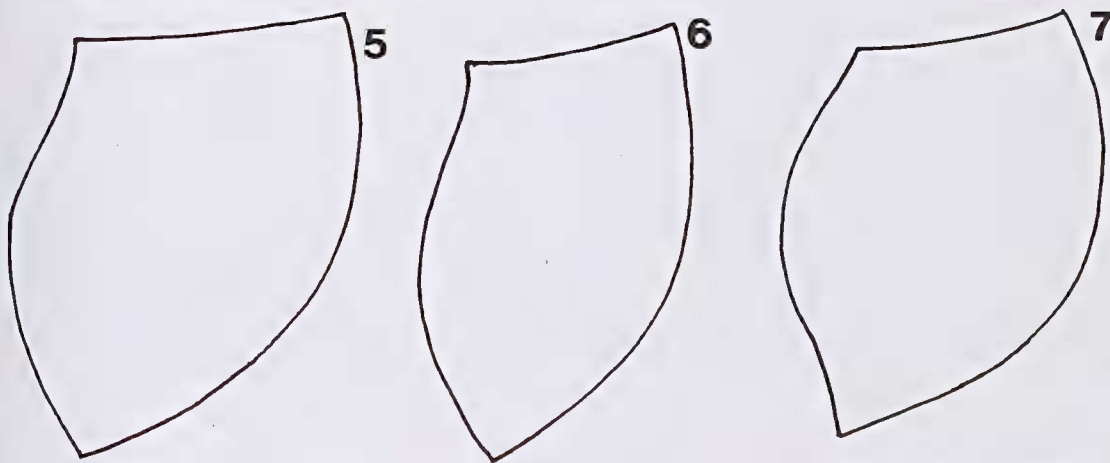
Melanella luminosa n. sp.

(Figs 1-5)

Description. Shell up to 5.75 mm high, tall, slender, narrowly and evenly conical, straight, height/diameter ratio 0.36-0.41 (mean 0.38), stout, perfectly smooth, translucent, colourless. Protoconch of about 1.5 convex whorls, 530 μ m wide, exposed part 630 μ m high, contour perfectly continuous with teleoconch, demarcated from teleoconch by growth scar. Teleoconch of up to 8.8 weakly convex whorls, 4 or 5 incremental scars at varying positions. Aperture small, ovate. Outer lip profile markedly prosocyrto-opisthocline. Columella almost straight. Last whorl of soft parts (white in ethanol) of living animal glowing luminescent lime yellow through translucent shell.



Figures 1–4. *Melanella luminosa*. 1. Holotype, apertural view, 5.75 x 2.25 mm. 2. Protoconch (height 630 μ m) of paratype, NMNZ M.131687. 3. Holotype, lateral view showing outer lip profile. 4. Two adults parasitising *Ocnus brevidentis* (Hutton, 1872) at type locality (from colour slide courtesy P. Ryan).



Figures 5–7. Camera lucida outlines of outer lip profiles of *Melanella* species. 5. *Melanella luminosa*, holotype, lip height 1.80 mm. 6. *Melanella aucklandica* (Suter, 1909), holotype, Auckland Islands, lip height 1.85 mm. 7. *Melanella archeyi* (Finlay, 1928), holotype, Chatham Islands, lip height 1.15 mm.

Type data. Holotype Museum of New Zealand, Wellington (NMNZ M.131738) and 15 paratypes – NMNZ (12, M.131687), Australian Museum, Sydney (1), Swedish Museum of Natural History, Stockholm (2): 46°03.2'E, 166°44.1'E, "Strawberry Fields", opposite Adam Head, Narrow Bend, Long Sound, Preservation Inlet, Southland, New Zealand, alive, parasitising the red (*carnleyensis* Dendy, 1909) form of the holothurian *Ocnus brevidentis* (Hutton, 1872), 15–18 m, 18 August 1996, C.D. Paulin.

Other material examined (25 specimens NMNZ): 44°04'S, 175°23.5'W, E of Forty Fours, Chatham Islands, dead, 238 m, 1 February 1954, m.v. *Alert* (1, M.10567); "The Gut", Bauza Island, Doubtful Islands, dead, 53 m, 16 February 1987, scuba, G.S.Hardy (12, M.131740); off Passage Sound, Fiordland, dead, 22–27 m, 8 January 1952, m.v. *Alert* (3, M.14693); between Point, Dusky Sound, Fiordland, dead, 37 m, 7/5/1950, m.v. *Alert* (4, M.13855); off Unnamed Island and Breaksea, Dusky Sound, dead, 37 m, 6/5/1950, m.v. *Alert* (1, M.13978); 46°02.95'S, Chalky Island, Chalky Inlet, Fiordland, dead, 37 m, 6/5/1950, m.v. *Alert* (1, M.13978); 46°02.95'S, 166°43.80'E, "38 fathom bay", Isthmus Sound, Preservation Inlet, Fiordland, dead, 10–18 m, 25 March 1993, scuba, A.L. Stewart, C.D. Paulin & C.D. Roberts (4, M.131737).

Distribution. Southern fiords of Southland and Chatham Islands, New Zealand, 10–238 m, taken alive at 15–18 m; external parasite of the holothurian *Ocnus brevidentis* (Hutton, 1872).

Remarks. *Melanella luminosa* closely resembles both *M. aucklandica* (Suter, 1909) and *M. archeyi* (Finlay, 1928). It resembles *M. aucklandica* (holotype Canterbury Museum, Christchurch M5489 – Fig. 6) in size relative to the number of whorls, and differs mainly in that the outer lip is more strongly prosoclyrt in profile, but also in attaining slightly smaller size (height 5.75, cf. 6.15 mm), and in being slightly more broadly conical (height/width ratio 0.36–0.41, mean 0.38; cf. 0.34–0.37, mean 0.35). It resembles *M. archeyi* (holotype Auckland Institute and Museum AK70288 – Fig. 7) in having a rather strongly opisthocline outer lip, but differs in attaining larger size (*M. archeyi* up to 4.20 mm high), and in being larger relative to the number of whorls (height 4.30 mm and 7 to 4.20 mm high), and in being larger relative to the number of whorls for holotype of *M. archeyi*. Most specimens of *M. archeyi* differ further in having slightly but distinctly more strongly convex teleoconch whorls. *M. archeyi* was treated as a synonym of *M. aucklandica* by Powell (1979), though it now seems clear that they are distinct species. All three *Melanella* species are widely distributed in southern New Zealand (NMNZ): *M. aucklandica* from Foveaux Strait, Pukaki Rise, and Stewart,

Auckland, Antipodes and Chatham islands, 0–140 m; *M. archeyi* from Stewart Island, outer coast of southern Fiordland, and the Chatham Islands, 0–15 m; *M. luminosa* from southern Fiordland and the Chatham Islands, 10–238 m. The host of *M. aucklandica* and *M. archeyi* is unknown, but as with other *Melanella* species it is sure to be holothurian (Warén, 1984), perhaps *Ocnus brevidentis*, which has a similar distribution in southern New Zealand (Pawson, 1970).

M. luminosa, *M. aucklandica* and *M. archeyi* are similar to the type species of *Melanella* (Heppell, 1995) and to other species referred there by Warén (1984).

Bioluminescence is rare in marine gastropods, and has been recorded only from some species of Planaxidae (Haneda, 1958; Houbrick, 1987; Ponder, 1988), a *Tonna* species (Tonnididae) (Haneda, 1958), and a few nudibranchs (Harvey, 1952; Nicol, 1964). Precisely which part of the anterior anatomy luminesces, the mode of light generation, the reason for luminescence, and the significance of lime yellow over blue light emission in *Melanella luminosa*, remains to be determined.

Etymology. Full of light (Latin).

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